POTENTIALS OF WATER LETTUCE MULCH ON GERMINATION AND PRELIMINARY GROWTH OF *Jatropha Curcas*

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Abstract

The potentials of water lettuce mulch as an aquatic macrophytes in enhancing germination and preliminary growth of *J. curcas* was investigated at the teaching and research farm of Ignatius Ajuru University of Education, Port- Harcourt. The experiment was laid out in a randomized complete block design (RCBD), with three treatments, replicated thrice. The treatments consist of 100g, 50g of water lettuce mulch and control. Data was obtained through direct observation and measurement computed through statistical means. Results from Data analysis shows that water lettuce mulch applied at the rate 100g and 50g gave significant increase in germination, plant height, number of leaves and root of *J, curcas* compared to control.

Keywords: Aquatic macrophytes, soil improvement, Germination and Growth promotion

INTRODUCTION:

The act of mulching is used largely by small and large scale growers all over the world. It is a system of covering the ground with large and course, usually natural material such as Straw, leftover crop, compost manure, dry grass, leaves and other material likely to decompose. Organic mulches are preferably used by farmers because of their ability to improve soil structure and provide a more neutral environment for good root growth, maintain soil moisture, slow soil erosion and sequester carbon. It invariably can decrease water loss, protect crops in winter and prevent weeds.

Water lettuce, an aquatic plant botanically known as *pistia stratiates* is a perennial herb, sometimes referred to as an ornamental water garden plant, native to tropical America (www.wildlifehawie.com.2010), belonging to the group of plants growing in River lakes swamps and seas etc, contributing greatly to the economic, Scientific and recreational importance

of water bodies in Nigeria. Reports from water treatments and examination Vol l 19p.223-238 stated that most aquatic plants (water lettuce included) has caused problems and ruined the livelihood of many people. In this respect, we have a duty to investigate on how this abundantly available source of biomass could be utilized for the benefit of people for whom it has created such havoc. Water lettuce may have advantage in soil fertility, however, the need to explore other economic and viable areas where this crop may assist in production of biogas, organic fertilizer, pulp and sewage treatment are necessary hence this research.

Jatropha curcas – commonly known as physic nut belongs to the family Euphorbiaceae. The plant grows quickly when planted and can survive in most soils. It is used as medicinal herbs and contain oil in the seed (Gullegoge Tintore *et al*, 2010). This crop thus attracted attention of various research organization, government, public and international development agencies and industries due to its usage as oil, as diesel fuel substitute and its role in erosion contro*l* (Martinez–Hazrera *et al* 2010, Ameen *et al* 2011). There is need to explore diverse cheap source natural biomass with the ability to increase the nutrient contents of soil for a greater productivity of this crop based on its economic importance. In view of these, the present research was designed to study how different levels of one of these obnoxious aquatic macrophyte mulch can help in enhancing the growth of this essential plant.

MATERIAL AND METHOD

The experiment was carried out at the research teaching farm of Ignatius Ajuru University of Education, Ndele Campus, Port Harcourt, Rivers State. The area of the experiment falls within latitude 4.7^0 and longitude 8 -10 East of the equator. The area has a heavy rainfall during rainy season and has sunshine during dry season. The experimental area was properly cleared and stumps were removed manually. Mapping was done with the use of tape and line. The experiment was laid out in a randomized complete block design (RCBD) with three treatments and each treatment replicated three times, the treatments were controls, 50g and 100g of water lettuce mulch with a total experimental area of $144m^2$.

CULTURAL DETAILS

The application of water lettuce was done five days before planting in ridges as mulch material. J*atropha curcas* seeds were planted four days after application of water lettuce mulch material. Five (5) seeds per bed with a spacing of 20cm x 20cm were planted. Each experimental unit was made up of the rows, each unit area was $1200cm^2$ with total experimental area of

144m^2. Supply of beating was done one week after first planting; weeding was done manually, thrice throughout the experimental period.

GROWTH EVALUATION

Growth evaluations used in the study were percentage germination, crop height, Number of leaves and root number. For data collection few plants were randomly tagged in each experimental unit and used in analysis viz, height, number of leaves and root number. Plant height was measured using a tape from the ground level to the top of the shoot and this was done once in two weeks after planting. The same tagged plants were used to determine the number of leaves and root number. In control plot, no application of water lettuce mulch was carried out.

RESULTS AND DISCUSSION

Results on germination, mean height and root number of *J. curcas* as affected by different level of water lettuce mulch are presented in Fig i, ii, iii and IV, the results shows that treatment with 50g rates of water lettuce mulch gave positive influence in the germination of *J. curcas* compared to control and 100g respectively (Fig.1). The result further indicates that application of water lettuce mulch at 50g per bed gave highest mean leaf number compared to other treatments (Fig ii).

However, application of water lettuce mulch at the rate of 100g per bed recorded highest plant height and root number of *Jatropha curcas* than 50g and control (Fig. iii and iv).

The least germination percentage of *Jatropha curcas* recorded in treatment (100g) of water lettuce compared to 50g and control was necessary, this could be attributed to inhibitory effects as a result of excess mulch material which will require longer time for biodegradation. Biodegradation was easier with 50g of water lettuce hence the release of essential nutrients - phosphorus, potassium and calcium for early plant uptake. This also led to restructuring of soil structure thereby promoting root growth and penetration and subsequent absorption of nutrient. (Peter 1989, Offor *et al.,* 2009 Lonbin 1988). The fact that root length, leaf number and plant height were progressively higher in treatment with 100g of water lettuce mulch shows that with time, degradation activities must have taken place which enhances other growth parameters, (Abu-Awad 1998; Da -Silva *et al* 2005).

From this study, it can be deduced that water lettuce mulch apart from constituting nuisance can be used in soil mitigation and promotion of plants growth.

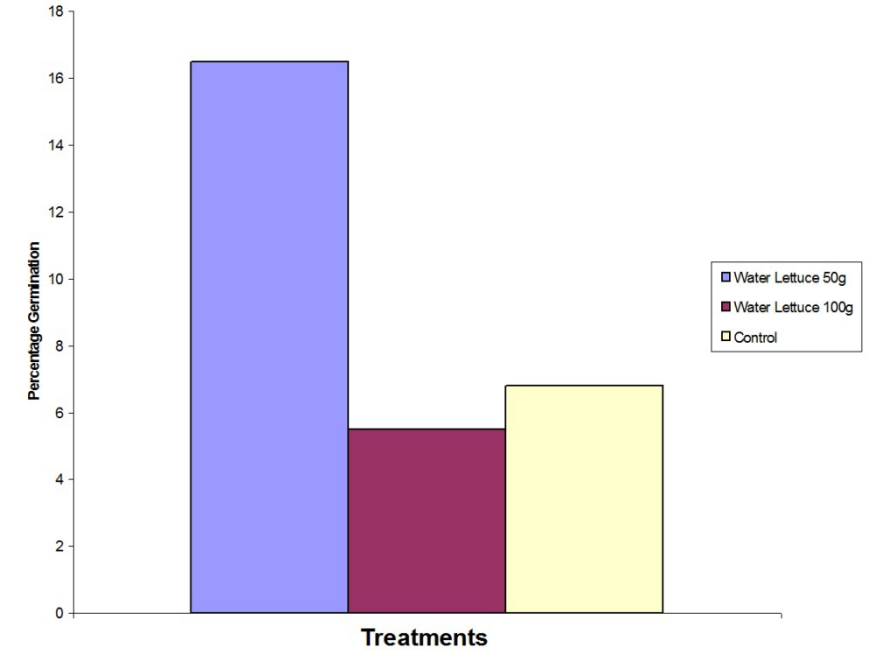

Fig. 1: Effect of Water Lettuce mulch on germination percentage of *Jatropha curcas*

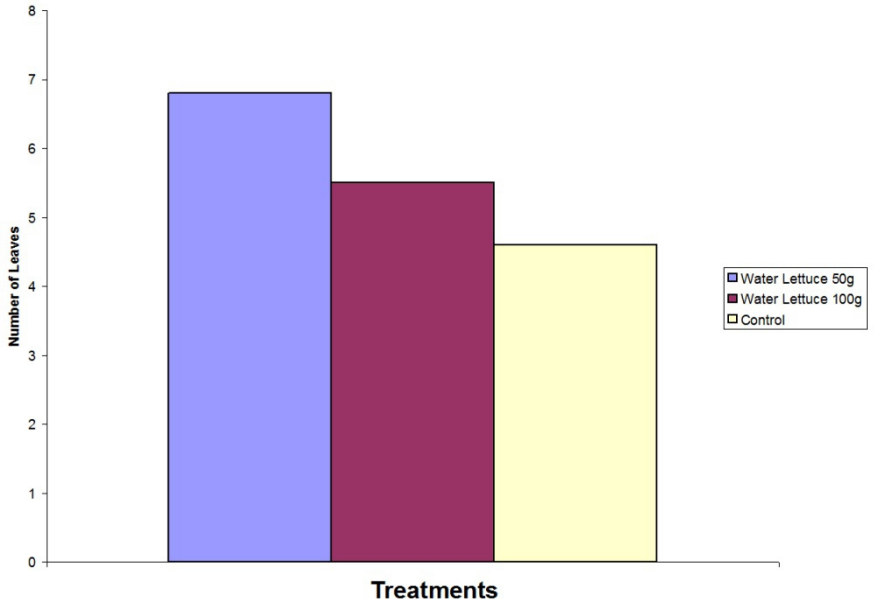

Fig. II: Effect of Water Lettuce mulch on Leaf number of *Jatropha curcas*

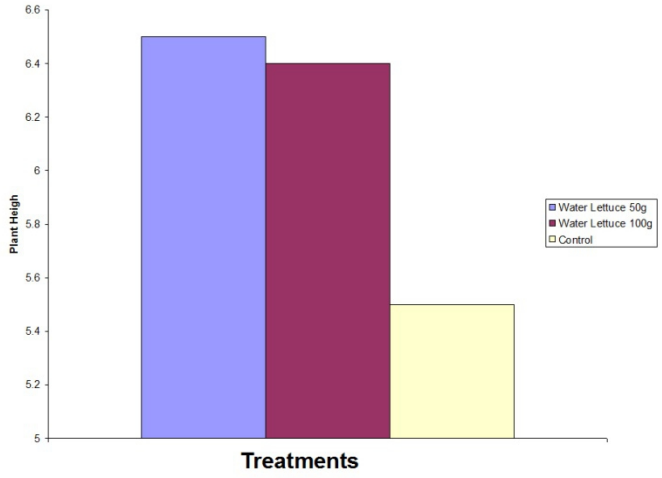

Fig. III: Effect of Water Lettuce mulch on Height of *Jatropha curcas*

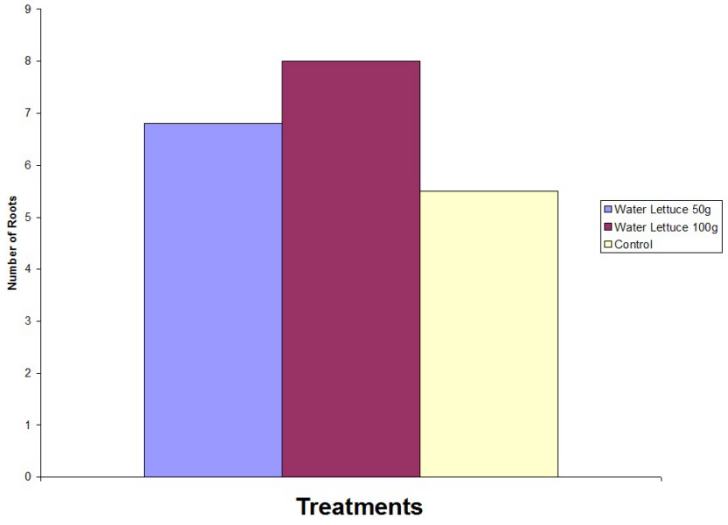

Fig. IV: Effect of Water Lettuce mulch on number of roots of *Jatropha curcas*

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